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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/943,967	08/30/2001	Syed Sajid Ahmad	3428.2US (97-828.2)	2663

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EXAMINER	
TRINH, MICHAEL MANH	

ART UNIT	PAPER NUMBER
2822	

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/943,967	AHMAD, SYED SAJID	
	Examiner	Art Unit	
	Michael Trinh	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *2/2/04 Amendment & 2/23/04 IDS*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-89* is/are pending in the application.

4a) Of the above claim(s) *20-24,31-41,45-47,66-72 and 87-89* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19,25-30,42-44,48-65 and 73-86* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2/2/04 & 2/23/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

*** This office action is in response to Applicant's amendment filed on February 02, 2004. Claims 1-89 are currently pending, in which claims 20-24,31-41,45-47,66,67-72,87-89 are non-elected, without traverse.

*** The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

1. Claims 1-5,7-11,13-16,43-44,48-52,54-58,60-62,85 and 86 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakai et al (5,185,040).

Sakai teaches (at col 4, line 41 through col 5; Figs 1-8) a method for applying viscous material to at least one semiconductor element comprising at least the steps of: providing a receptacle 4 including at least one viscous material pool 4 containing viscous paste material 2f having an exposed surface extending upwardly to a height therein in a precise location (Figs 1-3; col 4, lines 41-63; col 2, lines 43-49), said at least one viscous material pool including at least one opening as outlet to provide access to at least the exposed surface of the viscous material; providing at least one stop 3,9 approximate the receptacle (Fig 3,8); controlling the height of the exposed surface of the viscous material by hydraulic pressure means 5 pumping the material up and down (col 4, lines 64-68 and 46-50); and placing at least one semiconductor element 1 against the at least one stop 3 such that only a specific portion of the at least one semiconductor element contacts the exposed surface of the viscous material (Figs 3-4; col 5, lines 3-12), wherein the viscous material 2f is extruding through a coating stencil 3 to reveal the exposed surface. Re further claims 2-3 and 49-50, wherein the paste material 2f is adhesive (col 4, lines 67-68) and flowable. Re further claims 4-5 and 51-52, wherein during placing the semiconductor element extends into the viscous paste material 2f for a sufficient time so as to wet and adhere the paste material 2f along the sides of the semiconductor elements (figs 3-4). Re claims 7 and 54, wherein the element extends beyond the viscous material 3a and formed on the element 1 the material 2f without breaking the surface tension (Figs 3-4). Re claims 8 and 55, wherein the receptacle 3 is shaped such that the viscous material 3a is presented in a precise location and configuration (Fig 3). Re further claims 9-10 and 56-57, wherein a trace pad or

bond pad of the semiconductor element is inherently placed above the opening having the viscous paste material 2f in alignment manner so as to provide electrical connections to internal circuit of the semiconductor element. Re further claim 13-16,60-62, wherein the viscous material 3a is raised upward from the pool (Figs 2-3) by pumping the viscous paste material by using the pressure means 5 or immersion inherently created a moving wave of the viscous material traveling across the pool along the split 3a in vertical and horizontal direction (Figs 3,8), wherein the pressure means controls leveling of the viscous material during pumping (col 3, lines 4-20). Re claims 44,73-74,75,86, wherein the coating stencil 3/9 having a plurality of rectangular shaped apertures having predetermined size controls and adjusts the extrusion of viscous material 2f to a desired height (Figs 7-8; col 5, lines 21-52). Re claims 43,85, wherein as shown in Figure 7 the receptacle includes a housing having an inflow chamber in fluid communication, wherein the slit plate 3 with side plates 9 submerged in the viscous material is a buoyant stop independent form the receptacle, wherein the semiconductor element is press.

Claim Rejections - 35 USC § 103

2. Claims 12 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al (5,185,040) taken with Abraham et al (5,907,246).

Sakai teaches a method for applying viscous material to at least one semiconductor element as applied to claims 1-5,7-11,13-16,43-44,48-52,54-58,60-62,85 and 86 above.

Sakai teaches using a hold member for biasing the semiconductor element to the viscous material (col 4, lines 54-68; Figs 2-3), but lacks mentioning of hydraulic, pneumatic, or electrical mechanisms

However, Abraham teaches (at Fig 14, col 7,lines 17-35) using hydraulic, electrical, mechanical, or pneumatic mechanism for biasing and moving a semiconductor elements.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to biasing down the semiconductor elements of Sakai by using suitable hydraulic, electrical, mechanical, or pneumatic mechanism as taught by Abraham. This is because of the desirability to employ these automatic and control means for biasing up and down of the semiconductor elements to the viscous material in a precise manner.

3. Claims 42 and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al (5,185,040) taken with Kawakatsu (5,388,752).

Sakai teaches a method for applying viscous material to at least one semiconductor element as applied to claims 1-5,7-11,13-16,43-44,48-52,54-58,60-62,85 and 86 above.

Sakai lacks having a circulation mechanism to circulate the viscous material.

However, Kawakatsu teaches (at Fig 1; col 3, lines 9-26) providing a circulation mechanism 14 in the pool of viscous material, wherein the mechanism 14 is rotated in the pool.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the pool of Sakai by including a circulation mechanism 14 in the pool as taught by Kawakatsu. This is because of the desirability to move and circulate the viscous material in the pool, wherein the circulation consequently maintains the uniformity of the viscous material in the pool.

Re further claims 6 and 53, Sakai teaches immersing the element into the viscous material, but lacks mentioning for a time of 20-25 milliseconds. Re further claims 17 and 63, the viscous material has a thickness of 0.1 to 15 mils on a portion of the semiconductor elements. However, in the absence of unexpected results, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to select, optimize and determine an appropriate time period for immersing, because it has been held to be obvious to select a value by optimization for the best results, see In re Aller, etal., 105 USPQ 233; In re Waite 77 USPQ 586 (CCPA 1948); In Re Swanson 56 USPQ 372 (CCPA 1942). Employing these specific parameters would have been obvious to one of ordinary skill in the art, since these parameters are art-recognized variables which are subjected to routine experimentation and optimization. And, even if applicant's modifications results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art, In re Sola 25 USPQ 433.

4. Claims 6,17,53,63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al (5,185,040) taken with Kawakatsu (5,388,752).

Sakai teaches a method for applying viscous material to at least one semiconductor element as applied to claims 1-5,7-11,13-16,43-44,48-52,54-58,60-62,85 and 86 above.

Re further claims 6 and 53, Sakai teaches immersing the element into the viscous material, but lacks mentioning for a time of 20-25 milliseconds. Re further claims 17 and 63, the viscous material has a thickness of 0.1 to 15 mils on a portion of the semiconductor elements.

However, Kawakatsu teaches (at col 2, lines 55-65) a time period for applying solder balls by controlling the speed, such as 0.2 meters per minute, of the conveyor having work pieces 4 thereon. Thus, in the absence of unexpected results, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to select, optimize and determine an appropriate time period for immersing, or an appropriate thickness of the viscous material on the semiconductor element, because it has been held to be obvious to select a value by optimization for the best results, see In re Aller, etal., 105 USPQ 233; In re Waite 77 USPQ 586 (CCPA 1948); In Re Swanson 56 USPQ 372 (CCPA 1942). Employing these specific parameters would have been obvious to one of ordinary skill in the art, since these parameters are art-recognized variables which are subjected to routine experimentation and optimization. And, even if applicant's modifications results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art, In re Sola 25 USPQ 433.

5. Claim 19 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al (5,185,040) taken with Numata et al (4,690,999).

Sakai teaches a method for applying viscous material to at least one semiconductor element as applied to claims 1-5,7-11,13-16,43-44,48-52,54-58,60-62,85 and 86 above.

Sakai lacks include an adhesion promoter of silane, siloxane, or polyimide-siloxane to the viscous material.

However, Numata teaches (at col 9, lines 3-13) adding into a material an adhesion promoter of silane, siloxane or polyimide-siloxane.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the pool of Sakai by adding an adhesion promoter of silane, siloxane, or polyimide-silane as taught by Numata. This is because of the desirability to improve adhesion between the semiconductor elements and the viscous material.

6. Claim 18 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al (5,185,040) taken with Smith et al (5,747,102).

Sakai teaches a method for applying viscous material to at least one semiconductor element as applied to claims 1-5,7-11,13-16,43-44,48-52,54-58,60-62,85 and 86 above.

Sakai lacks applying the semiconductor element with a surfactant prior to placing step.

However, Smith teaches (at col 2, lines 37-46) improving solder wetting by applying a surfactant on a surface first.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of Sakai by applying a surfactant on the semiconductor element prior to placing a solder thereon as taught y Smith. This is because of the desirability to improve solder wetting and to limit reoxidation of the underlying lead component.

7. Claims 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al (5,185,040) taken with Fujita (2-37964) and Sekita (5,105,661).

Sakai teaches a method for applying viscous material to at least one semiconductor element as applied to claims 1-5,7-11,13-16,43-44,48-52,54-58,60-62,85 and 86 above.

Sakai lacks controlling and adjust the height of the viscous material by using a detection mechanism comprising transmitter, receiver, and control unit (e.g. as in claim 26); or by using a detection mechanism also comprising an ultrasonic sound (e.g. re further claim 30).

However, Fujita teaches (in English abstract; Fig 1) controlling and automatically adjusting the height of a viscous material in a pool by using a detection mechanism comprising a laser transmitter, receiver, and control unit. Sekita teaches (at figs 1,2 and 5; col 2, line 34 through col 6) controlling and automatically adjusting the height of a viscous material in a pool by using a detection mechanism comprising an ultrasonic sound transmitter, receiver, and control unit, wherein the control unit generates a signal to stop supplying of the viscous material.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the viscous material in the pool of Sakai by employing these detection means for controlling and adjusting the level of the viscous material in the pool, as taught by Fujita and Sekita. This is because of the desirability to monitor, to control, and to adjust the

viscous material in the pool to have a desired level so as to improve the application of the viscous material to the semiconductor element in a precise manner.

8. Claims 42 and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai et al (5,185,040) taken with Kawakatsu (5,388,752).

Sakai teaches a method for applying viscous material to at least one semiconductor element as applied to claims 1-5,7-11,13-16,43-44,48-52,54-58,60-62,85 and 86 above.

Sakai lacks having a circulation mechanism to circulate the viscous material.

However, Kawakatsu teaches (at Fig 1; col 3, lines 9-26) providing a circulation mechanism 14 in the pool of viscous material, wherein the mechanism 14 is rotated in the pool.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the pool of Sakai by including a circulation mechanism 14 in the pool as taught by Kawakatsu. This is because of the desirability to move and circulate the viscous material in the pool, wherein the circulation consequently maintains the uniformity of the viscous material in the pool.

Response to Arguments

9. Applicant's arguments filed February 02, 2004 have been fully considered but they are not persuasive, and are also moot in view of the new ground(s) of rejection.

** Applicant mainly remarks (at 2/2/04 remark pages 22-27) that "Sakai et al teach a method... wherein the electrode paste 2f is...introduced to at least three surfaces..." and "Applicant respectfully submits that Sakai fails to disclose, either expressly or inherently, placing the at least one semiconductor element against the at least one stop such that only a specific portion of the first surface the at least one semiconductor element contacts the exposed surface of the viscous material. Instead, Sakai discloses applying electrode paste to a plurality of surfaces of a plate-shaped electronic component".

In response, it is noted and found unconvincing. In the contrary, Sakai (5,185,040) expressly teaches (at column 6, lines 1-10) that "...However, the present invention is also applicable to the case of forming electrodes **only on the end surface 1a**...".

Accordingly, the rejections are outstanding and maintained.

****

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (571) 272-1847. The examiner can normally be reached on M-F from 8:30 Am to 4:30 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Oacs-eDan-6

Michael Trinh
Primary Examiner